DOCUMENT RESUME

ED 158 169 CG 012 659

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TITLE The Meta-Contrast Technique (MCT) as a Test of Anxiety in Childhood and Adolescence.
INSTITUTION Lund Univ. (Sweden).
PUB DATE 77
NOTE 22p.

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Adolescents; *Anxiety; Children; *Clinical Diagnosis; Foreign Countries; *Identification (Psychological); Psychological Patterns; Psychological Testing; Research Projects; *Visual Perception
IDENTIFIERS *Meta Contrast Technique; *Sweden

ABSTRACT

The Meta-Contrast Technique (MCT) was used for a differential diagnosis of anxiety-ridden children aged 4-16 years. Signs of open fright in the test situation showed the greatest correlation with symptoms of paroxysmal anxiety (in older children). Other severe signs of anxiety were fusion between the hero and the threat, leaking defense formations, zero phases with no meaningful content, and direct attempts at flight. Dark formations were particularly typical of children with phobic or pseudo-phobic types of anxiety. There was reason to assume that these findings, at least as far as adolescent subjects are concerned, would also apply to adults. (Author)

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PSYCHOLOGICAL RESEARCH BULLETIN

XVII:2 1977

ED158169

The Meta-Contrast Technique (MCT) as a Test of Anxiety in Childhood and Adolescence

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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This Bulletin is automatically superseded upon formal publication of the material

A b s t r a c t . - Used the Meta-Contrast Technique (MCT) for a differential diagnosis of anxiety-ridden children aged 4-16 years. Signs of open fright in the test situation showed the greatest correlation with symptoms of paroxysmal anxiety (in older children). Other severe signs of anxiety were fusion between the hero and the threat, leaking defense formations, zero phases with no meaningful content, and direct attempts at flight. Dark formations were particularly typical of children with phobic or pseudo-phobic types of anxiety. There was reason to assume that these findings, at least as far as adolescent subjects are concerned, would also apply to adults.

I n t r o d u c t i o n

The Meta-Contrast Technique (MCT) dates back as far as 1952 when George S. Klein and the senior author were testing methods to operationally define tolerance for ambiguity. One such method implied presentation of two schematic faces, one sad and one happy, after each other in a tachistoscope. The researchers asked how much exposure times would have to be prolonged before the subject could identify both of the contrasting stimuli. The question was never answered because the pilot subjects did not behave as expected. If, at that time, we had known of the work on perceptual contrast by Werner (1940), Cheatam (1952) and others we would have been able to predict that the first stimulus would be masked by the second one.

Other reactions were more surprising. When a smiling face was presented before a neutral one by which it was masked, some subjects reported peculiar impressions of the second face, e.g., that in spite of the neutral expression around the mouth the eyes were twinkling with supressed mirth, etc. This discovery of the subliminal effects of the masked stimulus in a meta-contrast design was the starting signal for a long series of studies on subliminal perception (Smith and Henriksson, 1955; Klein, Spence, Holt, and Gourevitch, 1958; Smith, Spence, and Klein, 1959, etc).

At the same time the meta-contrast technique offered results of diagnostic interest. Smith and Henriksson (1956) worked with psychiatric patients. Using pairs of incongruent stimuli they found that subliminal effects were particularly dramatic in paranoid patients. The perceptual process triggered off by the masked stimulus (A) was for a long time not allowed an expression of its own but was expressed only via the process leading up to the conscious perception of the masking stimulus (B). It seemed to be an adaptive strategy analogous with the workings of the defense mechanism of projection where a subject refuses to admit, e.g., his own aggressive impulses but perceives them in the behavior of other people. Similarly, it was found that individuals with isolating defensive strategies also isolated the subliminal influence from their conscious percepts and reported no subliminal effects in the MCT situation.

The personality-oriented work with the MCT was influenced by (1) the emphasis on cognitive style typical of the early work of George S. Klein and his associates (Klein and Schlesinger, 1949; Holzman and Klein, 1954, etc), (2) the interest in percept-genetic (PG) processes already cultivated during the fourties by a group of young psychologists at Lund University. The first factor, in particular, led our attention to the formal attributes of adaptive strategies and motivated the choice of such "impersonal" pairs of stimuli as those still used in the incongruent MCT series. However,interest in events over time, even micro-time, contributed to making the MCT an instrument for the analysis of how a new percept develops within the frame of a stabilized one. The stabilized percept corresponded to the masking stimulus (B) to which the subject had been adapted beforehand; the new perceptual process was initiated by the masked stimulus (A), presented to the subject in small time quanta and only grad-

ually allowing him to reach the final stage of correct identification. The advantage of viewing cognitive style as an event over time was simultaneously demonstrated in another field of study (Smith and Klein, 1953).

As just mentioned, the inquiry into the perceptual process style of individuals confronted with conflicting stimulation produced a series of results which could be used to illuminate normal personality characteristics as well as pathological symptom formation. The parallel development of a test originally intended for screening of air-plane pilots, the Defense Mechanism Test or DMT (Kragh, 1969), inspired us to supplement our incongruent stimulus pairs with pairs where stimulus A was a threat and stimuls B included a person against whom the threat was aimed. This partial similarity between the MCT and the DMT should not lead their users to overlook the considerable differences between them. In the DMT the experimenter uses one stimulus picture where the threat is placed periferally. The MCT entertains two different stimuli and interest is centered not only on the development of A but also on how the subject´s habitual field of perception (his report of B) is influenced by the developing new (incongruous or threatening) percept, even while A remains subliminal. The difference between the MCT and the DMT as diagnostic instruments has been demonstrated by Palmquist (1974).

The choice of incongruent or threatening stimuli was motivated by an attempt to produce small (extra) amounts of anxiety in our subjects and, as a consequence, to facilitate defensive operations. In order to learn how to read the subject´s perceptual reports with an eye to his defensive activity, an extensive validation program was started in the late fifties. The early part of it was accounted for in a manual (Smith

et al., 1970; see also Kragh and Smith, 1970) but the validation is still going on. While early emphasis was on adaptive and defensive characteristics in adults, particularly adults with psychiatric problems,the focus of attention has been shifted in the present work to younger people, including both normal and clinical subjects. While interest in defensive formations still remains, especially with regard to early precursors of adult strategies, interest in anxiety itself has increased. The present paper concerns anxiety in children and adolescents as reflected in the MCT.

Tests like the MCT and DMT have much in common with conventional projective tests. Knowledgeable readers will probably detect how some scoring principles used in the Rorschach test return in disguised form in the MCT. However, as pointed out by Kragh and Smith (1970) the process character of the PG methods sets them apart from their predecessors. A PG test implies reconstruction of a perceptual process which (1) usually occurs over micro-time, unnoticed by the perceiver, and (2) grows out of a broad functional context but ideally leads to a percept free from subjective influence. The early reports in a PG test (P-phases) are most likely to be typical of primitive and "early" aspects of the perceiver, while reports closer to the stage of final recognition of the stimulus (the C-phase) are expected to be more direct reflections of his present functional status. A differentiation between early (latent) and late (manifest) signs in a PG may,therefore, be important, particularly as far as adult subjects are concerned.

The test method

The MCT has been described in detail in Kragh and Smith (1970) and in the Swedish manual (Smith et al., 1970). It involves the tachistoscopic presentation of pairs of stim-

uli (A and B). Stimulus A (A_1 = a car) is either incongruent with B (B_1 = a living room) or implies a threat (A_2 = a forbidding face) directed against B (B_2 = a boy sitting at a table with a small window in the background). B is first presented at gradually prolonged exposure times. (Starting with 0.01 sec, exposure steps are arranged in a geometric series with a quotient of $\sqrt{2}$). When the subject has reported B correctly, the exposure time is reduced to a standard level (about 0.06 sec). Presentations of B at this level constitute a control series which, unnoticed by the subject, continues into the main series where A is exposed immediately before B. While the exposure time of B is kept constant, that of A is gradually prolonged until A+B have been correctly reported in three consecutive trials. Subjects are told to report everything they saw on the projection screen (behind which the projectors for A and B were placed) at any one trial.

The following minor deviations from the standard procedure should be noted: (1) While adults and school children sit at a distance of 1.6 m from the screen, preschool children sat about 50 cm closer to it. (2) These children, because they could not endure protracted testing, were generally only given single presentations at each exposure level in the A+B section of the test. (3) If necessary, a short pause was inserted between series 1 and series 2. (4) The experimenter not only recorded what the subject reported but also <u>how</u> he behaved in the situation.

The scoring dimensions will be presented in their relevant context. Using as concrete and detailed descriptions of these dimensions as practically possible the present authors were independently able to arrive at very similar results when scoring the protocols. Minor divergences were settled in discussions.

The scoring was usually restricted to + (for certain presence) and - (for absence). In some cases (+) was used for doubtful presence. The latter estimate will, however, be exploited only in a few instances, explicitly mentioned in the text. The present analysis mainly concerns series 2.

In order to be able to differentiate between early and late signs, we also counted the number of exposures beginning with the first A+B presentations and ending with the C-phase, i.e., the first exposure in the triad of correct recognitions (if any), and identified the last third of this exposure series.

T h e s c o r i n g o f a n x i e t y

The first signs of anxiety, as taken down in the manual, were dark or black formations. A subject perhaps reported black clouds in the window or particularly emphasized the darkness of the wall behind the hero. Correlations between this kind of sign and symptoms of anxiety were only moderate compared with others, e.g., between compulsive symptoms and varieties of isolating defense in the test.

In a later work summarizing the scoring of anxiety in adults (Smith, Sjöholm, and Nielzén, 1976) an important scoring principle was added. The authors stated that anxiety was scored "not only when dark formations (appeared) but also when formations offering protection (from) the threat were impaired or disappeared. The more solid, the more often ... the protective formation has been (repeated) before its impairment, the more intense the resulting anxiety would be" (p. 153). Three levels of anxiety were distinguished on the basis of this theoretical assumption as well as on the basis of previous empirical evidence.

(a) The B picture is reported as broken or impaired; the formation corresponding to A is impaired or disappears after repeated reports of a phobic formation (A seen as inanimate, lifeless and, at the same time, stimulus-distant) or a human face.

(b) A single report of a phobic formation is impaired or disappears; the whole window becomes grey or diffuse,rainstreaked, shadowed, etc; dark formations become prominent; the whole atmosphere seems more gruesome or uneasy.

(c) Successive impairment of relatively differentiated reports.

The subsequent validation in a group of anxiety-ridden adults showed that anxiety signs at the highest of these levels were more likely to correlate with symptoms of manifest anxiety than were other signs. Among the severe signs were reports where B had lost all meaningful content (zero phases), where its structures were perceived as broken or on the point of breaking, full of holes and crevices, etc, and reports when an A which had been perceived as an independent and well-structured formation again completely disappeared.Signs scored in the latter part of the A+B series were more valid than signs scored in earlier parts.

Following these ideas the validation work was continued,primarily with normal subjects aged 7-15 within a larger group aged 4-15 (Smith and Nordström, 1975; Smith and Danielsson, 1977a). In the absence of behavioral anxiety criteria, results in an afterimage test were used for tentative comparisons (cf. Smith and Danielsson, 1977b,c,d). According to these correlations, zero phases, broken structures and fusion appeared to be strong or moderate signs of anxiety.Fusion,a new sign, refers

to reports where someone corresponding to the A stimulus comes close to the hero in B, climbs over the window-sill, exchanges heads with the hero, fuses with him, is substituted for him until everything is confused, etc. In these cases A may be represented by a threatening individual, an old person, a parent, and the like, but not by an object or a playmate of the same age.

There seemed to be some difference between subjects in prepuberty and puberty (12-15 years), on the one hand, and younger subjects, on the other. Considering the greater instability of young children´s perceptual reports we had assumed that structural impairment would be less indicative of anxiety as compared with similar signs in older children. The results appeared to confirm this assumption. At the same time, hero discontinuity was a more common sign of anxiety in young subjects. This sign implies that, according to the subject´s report, the hero walks out of the picture or simply disappears. In addition, it seemed important to distinguish between early and late reports of dark structures, especially in the PG´s of older children, the late report being more indicative of manifest as opposed to latent anxiety.

In a special report concerning anxiety-ridden children (Smith and Danielsson, 1977c), we analyzed the fusion signs just mentioned together with signs of so-called leaking defense formations. A leaking defense formation cannot mask, distort or hold back the anxiety-colored qualities of perception but allows them to "leak through" the defensive fabric. Perhaps the subject reports a curtain in front of the window in B where A is being projected. However,behind this isolating formation the observer glimpses something dark and threatening. Fusion as well as leakage belong to the

signs to be investigated in the present study. They were both common in a pilot group of anxiety-ridden children (Smith and Nordström, 1975).

When our work with normal school children was extended to preschool children (Smith and Danielsson, 1977a) it became more important than before to pay attention to the child's behavior in the test situation. Obviously, young children could not internalize the anxiety triggered by the MCT but had to express it openly in their behavior. Even adults and older children had sometimes exhibited open anxiety when tested. In addition to such signs in small children, we also observed how they tried to flee from the whole situation by walking away, how they ran to the experimenter for shelter, etc. Even if these signs often implied that the child wanted to defend itself they were obviously simultaneous signs of open anxiety because the defense afforded only a momentary escape or relief. Other "non-structural" but more definite defense operations such as eye-shutting behavior or open denial of the existence of any threat, also typical of preschool children, were rather considered as <u>indirect</u> signs of imminent anxiety and will, therefore, not be included in the present study of manifest anxiety reactions.

S u b j e c t s

The subjects ranged from 4 to 16 years of age. All of them were patients at a children's psychiatric clinic and were accepted as test subjects if they showed symptoms of anxiety. Children suspected of brain dysfunction were not included. Subjects were free from medication while being tested except for a few cases where such treatment was absolutely necessary. Altogether there were 68 children (40 boys and 28 girls). The proportion of younger and older children is shown in Table 1 below. It ought to be added that among the younger children,

8 were at the preschool age as defined in Sweden, i.e., younger than 7.

These children were rated with respect to presence or absence of a number of symptoms. This rating relied on concrete information supplied by members of the clinical staff and was performed independently of the test scoring; it was practically impossible for the rater to associate the rating with a particular MCT protocol or to remember any details of the scoring. In our disposition of anxiety dimensions we have relied on Anthony (1975), among others. The following dimensions concern us here:

Paroxysmal anxiety: acute anxiety attacks, panic, other sudden and uncontrollable outbreaks, feelings of oncoming disaster. Even signs of doubtful presence (+) were considered.
Chronic anxiety: chronic states with high tension, several somatic symptoms or particularly severe symptoms such as persistent food refusals, vomiting, anticipation of something unpleasant or other apprehensions or "worries".
Focussed anxiety: unnecessary fear of particular persons or situations (including phobias as well as pseudo-phobias).
More diffuse anxiety reactions: minor somatic symptoms such as sleep disturbances, enuresis, nail biting, clawings, stomach upsets, headaches, etc.

R e s u l t s a n d c o n c l u s i o n s

Considering previous findings as well as the four classes of anxiety to which our subjects have been referred we decided to arrange the MCT signs in a four-level hierarchy.

(1) Open fright expressed in the test situation (particularly in school children where "internalized fright" would be a more normal reaction) and/or reports of broken struc-

tures.These signs were assumed to correspond to paroxysmal anxiety. It will be remembered that this anxiety was closely allied with feelings of oncoming disaster. This is one reason why reports of structures breaking down or dissolving were placed at this level of the hierarchy. In order to obtain a sufficient number of signs, we accepted (+)-signs at this level (cf. the scoring of paroxysmal anxiety).

(2) Other signs known to correspond to states of severe anxiety: fusion of the threat and the hero, leaking defense formations, at least two zero phases where nothing meaningful was perceived, direct attempts at flight from the test situation. While the first three types of signs were more or less self-evident at the level of severe, but not necessarily paroxysmal anxiety, the inclusion of flight might appear debatable. It can hardly be equated with panic since the attempt to escape is not completely unorganized. On the other hand, the fleeing subject demonstrates his inability to master the anxiety provoked by the MCT. The placement of flight one step below signs of panic would seem right.

(3) The hero reported missing (sheer neglect by the subject to mention the hero, not considered); human structures corresponding to (but not implying correct identification of) A reported impaired or missing; dark structures reported in the last third of the A+B sequence (correct,not unduly emphasized reports of blackness, not considered). The first sign represents escape, not open but symbolic flight. Impairment of defensive structures was shown to be a sign of anxiety breaking through. Human structures represent a rather advanced form of defense, close to the C-phase level, and impairment of them a more manifest form of anxiety than impairment of less advanced structures. These signs, including the direct dark reflections of anxiety close to the manifest surface,do not

seem to be quite on a par with signs at level 2 but still more marked than signs at the next level.

(4) Non-human structures, corresponding to A, reported impaired or missing; dark structures reported before the last third of the A+B sequence; reports of diffuse formations (fog, a rainstreaked or dirty window, etc.);somatic signs (a sudden need to go to the toilet, etc.); the subject seeking shelter with the experimenter. Here we have collected an assortment of early, less advanced, or more indirect signs.

This classification of anxiety signs was supported by a comparison, made in a previous paper (Smith and Danielsson, 1977c), of the present group of clinical subjects with a 4-15-year-old group of normals (55 preschool children, 72 school children). One group of signs was more or less exclusively concentrated to the clinical group, at least at school age (7 or more): open fright, zero phases, fusion and leaking formations. Thus zero phases were scored in 1% of the normal school children and 14% of the clinical ones. Analogous figures were: for fusion 3% and 19%, for leakage 11% and 37% and for open fright 0% and 21%. "Hero disappeared" was also concentrated to clinical school children (0% and 23%) but was more common than the other signs among normal preschool children (see also below). Black formations, regardless of placement, differentiated less clearly between anxiety-ridden children and normals; they were,for instance, scored in 36% of the normal school children and 65% of the clinical children at school age. The flight sign could not be tried here because it had not been considered when testing the normal group.

Due to its relative scarcity the sign of "broken structure",

was also omitted from the above comparison. Looking into the matter now, we find that it was not completely absent from the normal group. However, if we limit our scoring to cases where the report of a broken structure also seems to reflect sinister forebodings about an impending dissolution of the ordinary world,the sign becomes the exclusive concern of the clinical subjects. Four of these subjects were assigned this sign. Two of these four also showed open fright. One of the two remaining cases expressed forebodings just as described. In the other case, reports of a broken window were repeated several times, but in spite of this the sign was not of the most malignant kind. Ironically enough, the anxiety of this person was not rated as paroxysmal. By keeping him as scored in the table we thus do not favor our hypotheses.

Table 1. Correlation between the level of anxiety signs in the MCT and the clinical anxiety groups.

MCT signs	Level 1		Level 2		Level 1 + 2		Level 3		Level 4		N
Anxiety group	≥ 1 sign	%	≥ 1 sign	%	≥ 2 signs	%	≥ 1 sign	%	≥ 1 sign	%	
Paroxysmal anxiety											
(11)12-16	7		7		6		7		7		9
all	8	80	7	70	6	60	7	70	7	70	10
Chronic anxiety											
(11)12-16	2		7		4		8		8		13
all	8	27	19	63	9	30	21	70	16	53	30
Focussed anxiety											
(11)12-16	0		6		1		8		3		8
all	0	0	8	62	2	15	12	92	4	31	13
Other anxieties											
(11)12-16	1		2		1		4		2		5
all	2	13	6	40	2	13	9	60	6	40	15

The different anxiety symptoms were unevenly distributed over age levels, above all paroxysmal anxiety which was present in only one subject below the age of 12.(The younger a subject the less deviant an outbreak of so-called primary anxiety would seem to be). Because of this we have represented older subjects separately in Table 1. On the whole, it does not make much difference whether comparisons are based on the whole group or only on subjects above 11 years of age.

The main trends in the table are obvious. The interested reader is invited to compute a number of highly significant P values by comparing proportions. In the left column, the level 1 MCT signs are concentrated to the paroxysmal group. Signs at level 2 are still slightly more typical of this group. A better differentiation between all anxiety groups is again afforded by the number of different types of signs at both levels together. The great number of level 3 signs in the group with focussed anxiety will be analyzed in more detail later. At the lowest symptom level it can be observed how the relative number of MCT signs increases from left to right in the table or, to be more precise, from level 1 to levels 3+4. The fact that most subjects with high-level signs were also scored for signs at lower levels is consistent with the fact that the presence of severe symptoms often goes together with less severe ones.

The present group of clinical subjects as presented in the table cannot afford full clarity with respect to age differences between various signs. In a separate study of fusion and leaking formations (Smith and Danielsson, 1977c), however, it could be demonstrated that fusion belonged to young and/or cognitively immature subjects and leaking to older and/or more mature ones. The probability and danger

of intrusions from outside was deemed to be particularly high in children where the sense of self was not yet (or was just about to become) clearly articulated. Analogously, the leakage of a defense mechanism would not only be more easily noticed in subjects with well-structured defenses but also represent a more serious alarm signal.

The same study indicated that "hero disappeared" did not differentiate between normal and clinical subjects as effectively as fusion and leakage. To be more precise, this relative lack of differentiating power refers to the preschool level where 24% of the normals had this sign. However, even if the sign differentiates well between normal and clinical school children there are no convincing indications within the clinical group of its being on a par with level 2 signs. One more result deserves to be cited from this study: no normal school children were scored for open fright but 16% of the preschool children received this score. We had expected that this sign would lose its power as the subjects decreased in age.

It had also been assumed that zero phases would be typically related to age and cognitive maturity. The more unstable a child's conception of outside reality the less indicative of anxiety these intermittent breaks in a series of perceptual reports would be. This assumption was supported by previous results (Smith and Nordström, 1975; Smith and Danielsson, 1977a) but could not be clearly confirmed here. The sign was not particularly common. It may also be surmised that our reluctance to score zero phases increased as the age of the subjects decreased, a tendency which would contribute to making zero phases, when scored, more equal diagnostically at different age levels. This may also have been true of the sign of flight which did not, as expected, become "less severe" as the age of the subjects decreased.

As far as level 1 signs among 12-16-year-old subjects are concerned we would like to emphasize not only their correlation with paroxysmal anxiety but with other signs of serious dysfunctioning as well. In a separate study of process discontinuity in an afterimage test (Smith and Danielsson, 1977d) it was shown that this discontinuity not only went together with paroxysmal symptoms and level 1 anxiety signs in the MCT but also with signs of discontinuity in the PG process laid bare by the latter test. Among these discontinuities were zero phases. A sudden break in the stable frame percept is thus likely to indicate two conditions: discontinuous (often near-psychotic or psychotic) functioning and spells of severe anxiety. As seen in Table 1, zero phases and other level 2 signs may be indicative of rectangular forms of anxiety, but less exclusively than level 1 signs.

One difference indicated in Table 1 between subjects with symptoms of chronic anxiety, on the one hand, and focussed anxiety, on the other, was that children with chronic anxiety had several types of severe signs while children with focussed anxiety usually showed fewer signs. Lacking above all signs of open fright, the latter children with their phobic and pseudo-phobic fears appear particularly inclined to project anxiety into their reports of dark perceptual formations. Among 13 focussed subjects, 11 reported black but no level 1 signs; among 30 chronic subjects only 13 made such a report ($P = 0.02$, Fisher's exact test, two-sided), 13 not reporting black at all.

We also have reason to assume that the practical application of the anxiety scoring can be extended to older subjects; previous data from anxiety-ridden adults and comparable aspects of the present data, particularly from adolescents,

are analogous in many ways. Even subjects excluded as brain-injured from this group of children can substantiate observations made in adults: all subjects with brain dysfunction are characterized by their inability to bring structure to the tachistoscopic material, at least until exposure times have been prolonged far beyond normal values.

Talking about anxiety signs at different levels of our hierarchy we would like to caution the reader (and ourselves as well) against too much reliance on such scoring schemata.The severity of a sign not only depends on its place in a diagnostic hierarchy but also on the context where it appears. Thus there is a difference between an individual where leakage leads to a subsequent strengthening of the defensive effort and an individual who can respond with nothing better than regression to infantile strategies or who submits to open flight;the leakage sign seen in the latter context probably being more negative prognostically than the former. In a similar way, fusion is a more serious indication in an individual lacking structured defenses than in an individual where such defenses are available in his PG.

We also know that the placement of a sign, late or early, may be of importance. Only black formations were differentiated here with respect to placement, mainly because most severe signs appeared at comparatively late trials in the PG anyhow. It should also be realized that in young children a differentiation of early and late sequence positions could not always be made with certainty because of the indeterminateness of their C-phase levels.

In sum, then, the anxiety signs in the MCT should be used not only in relation to the age of the subject but also in relation to the process context where they are scored. Mechanical

annotations are not only of little value but may lead to erroneous conclusions with respect to a patient. Used with discrimination and a reasonable amount of psychological understanding the MCT can serve to elucidate the role of anxiety in the context of an individual's adaptive and defensive endeavors.

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